Do intensive preoperative and postoperative multidisciplinary interventions impact health-related bariatric surgery outcomes? A systematic review

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Do intensive preoperative and postoperative multidisciplinary interventions impact health-related bariatric surgery outcomes?

A systematic literature review and meta-analysis

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Variation in response to bariatric surgery

Type of surgery

Surgical technique

Non-modifiable patient variation

Psychosocial variables

Eating patterns

Physical activity

Follow-up attendance

Multidisciplinary Team

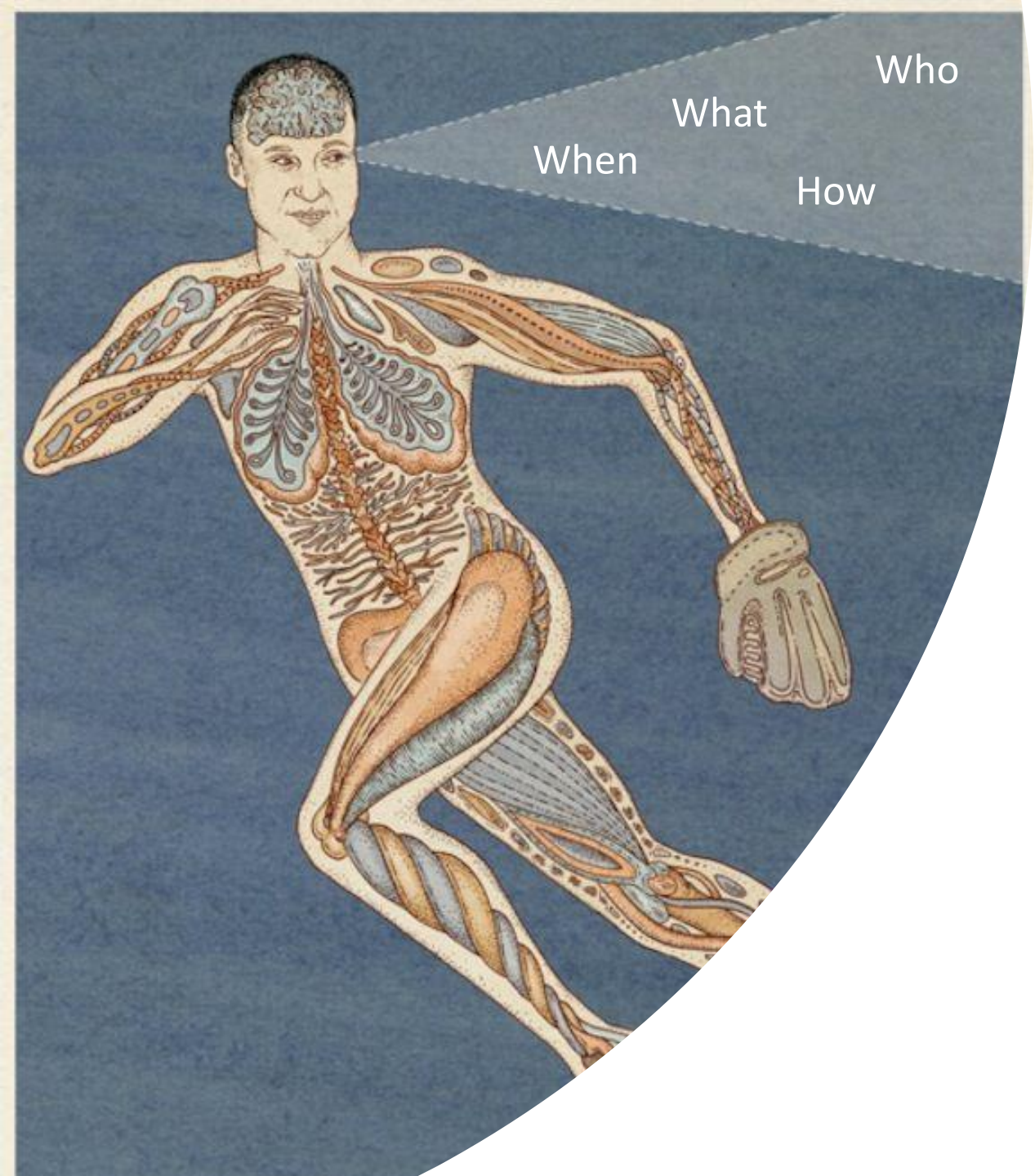
Different perspective

Coordinated expertise and skills

Sufficient patient engagement

- **Pre-op: diet, psychosocial**
- **Post-op: follow-up: diet, exercise, behavioural**

2013 AACE/TOS/ASMS Clinical Practice Guidelines



What is the effect of intensive versus standard pre- and/or postoperative MDT interventions on health-related outcomes post-surgery in adult bariatric patients?

SLR Methods & Findings

6 Databases

Pre-op ≥2 weeks or
Post-op ≥3 months

≥3 disciplines

6,871 records screened

18 RCTs
(34 publications)

940 total participants

Unclear to high risk of bias
(Cochrane)

5 Meta-analyses (RevMan)

GRADE
Certainty in body of evidence

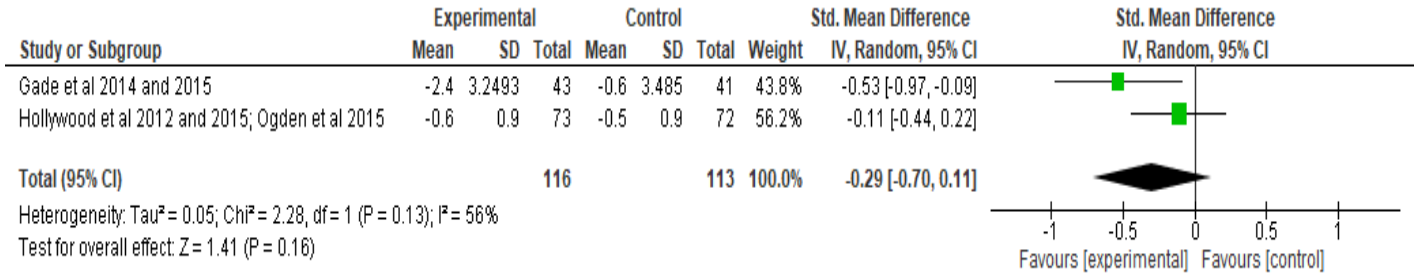
MDT characteristics

	Lifestyle & nutrition interventions n=4 studies	Psychology interventions n=5 studies	Physical focused interventions n=9 studies
• Added a health discipline • Increased intensity	• 100% • 100%	• 100% • 80%	• 100% • 100%
Interventionists	• 75% dietitian • 25% surgeon • 25% unclear	• 20% physiotherapist • 80% psychologist • 20% psychiatrist • 20% therapist	• 11% dietitian • 33% physiotherapist • 11% psychiatrist • 44% exercise specialist • 22% other
Content	Mostly counselling	Mostly CBT	Mostly supervised physical activity

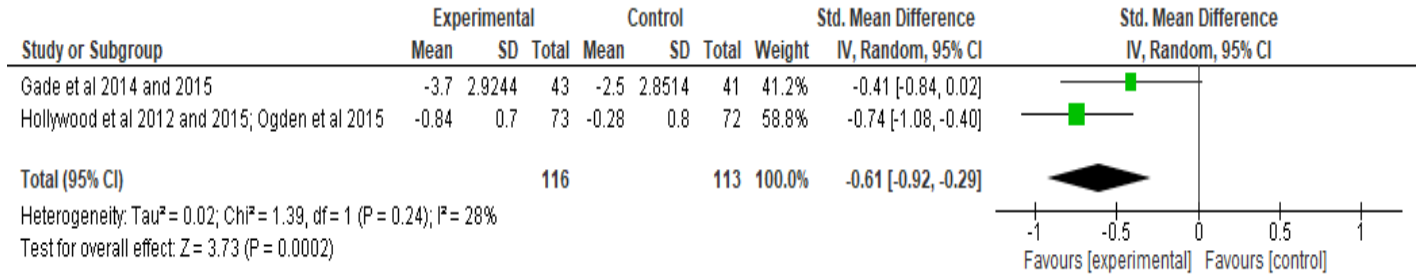
Implementation characteristics

	Lifestyle & nutrition focused interventions n=4 studies	Psychology focused interventions n=5 studies	Physical activity focused interventions n=9 studies
• Pre-op • Post-op • Pre- and post-op	• 2 (50%) • 2 (50%) • 0	• 1 (20%) • 2 (40%) • 2 (40%)	• 2 (22%) • 6 (67%) • 1 (11%)
Duration: • Pre-op • Post-op • Pre- and post-op	• 6-months • 4 to 7.5-months • N/A	• 2.5-months • 6 to 12-months • 3.5 to 13.5-months	• 1.5 to 3-months • 3 to 6-months • 6.5-months

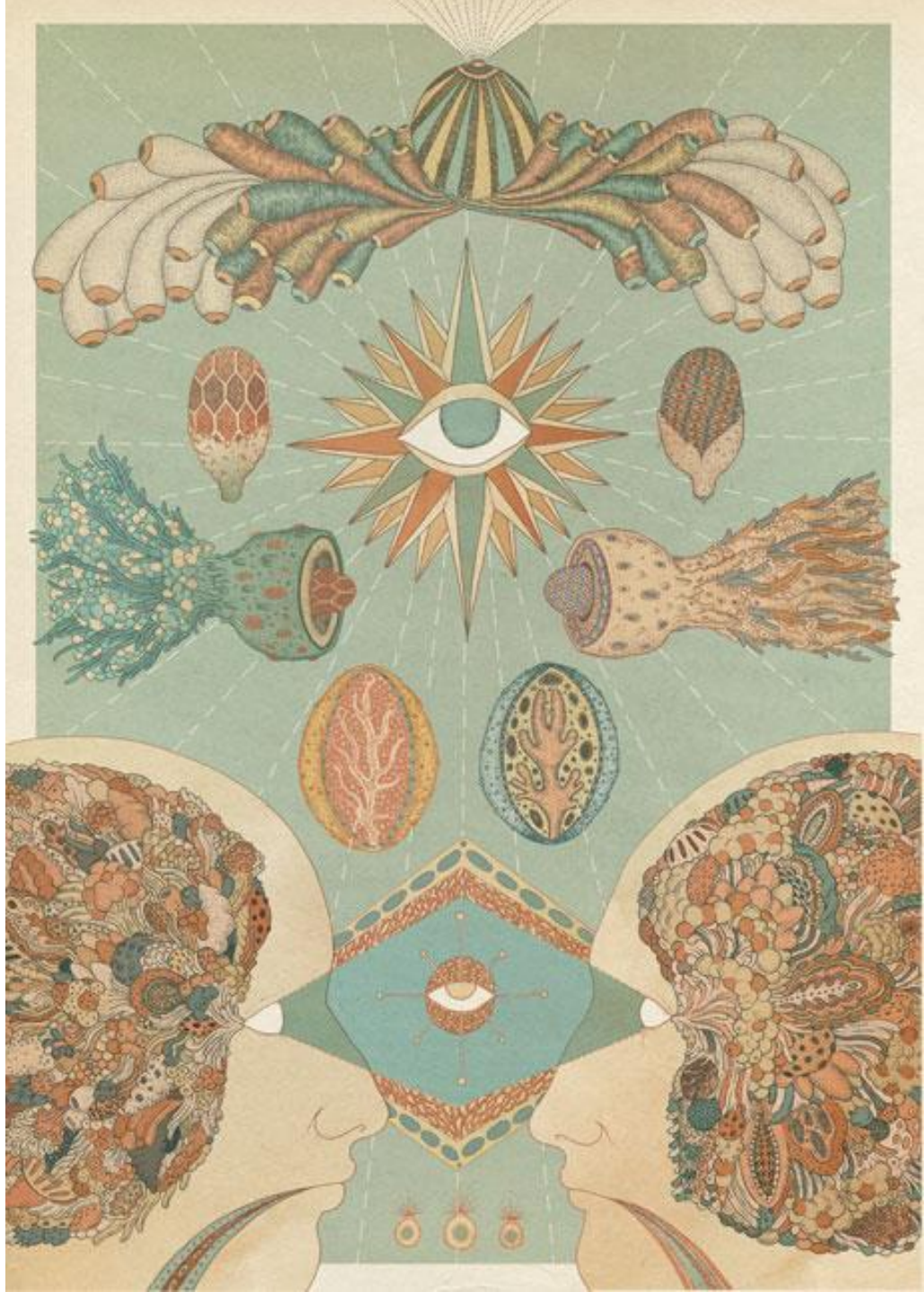
Anxiety & Depression

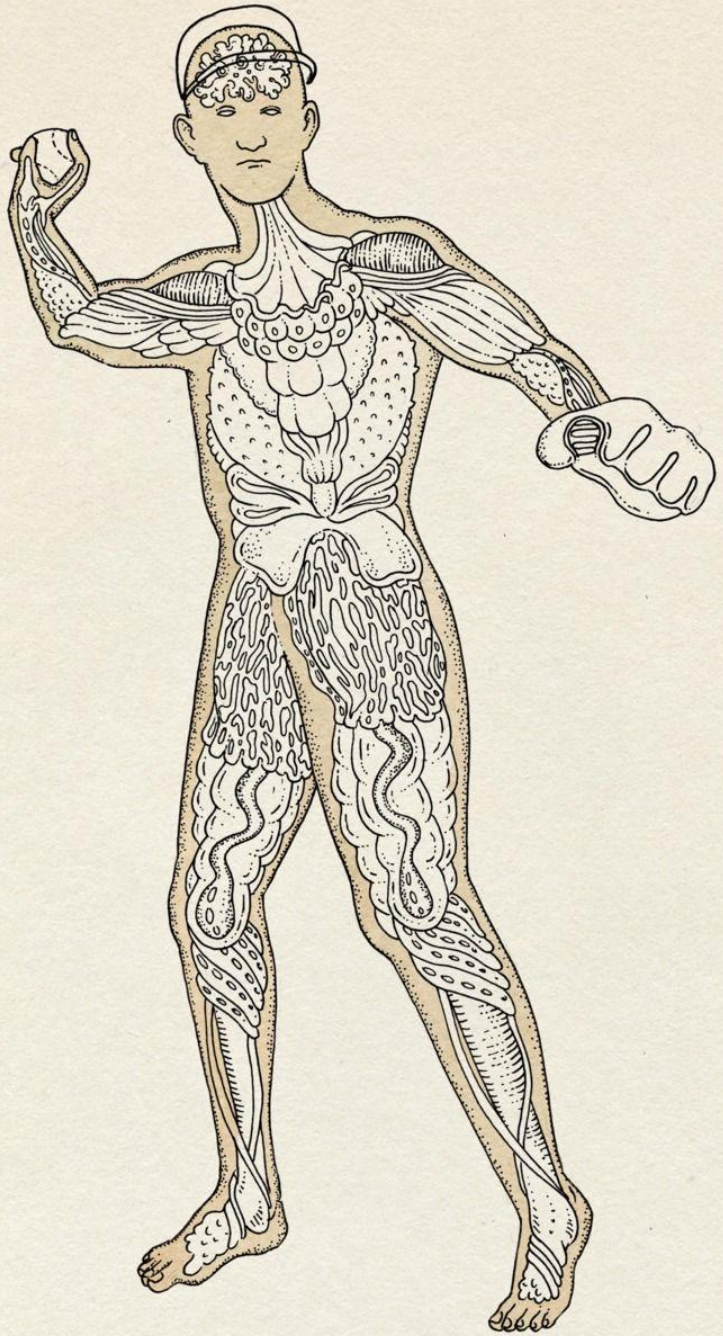


Psychological interventions had **no effect** on post-op anxiety
(SMD: -0.29 [95%CI: -0.70, 0.11] p=0.16; moderate heterogeneity; GRADE: Very low)



Psychological interventions **decreased depression** symptom scores
(SMD: -0.61 [95%CI: -0.92, -0.29]; p=0.0002; low heterogeneity; GRADE: Very low)

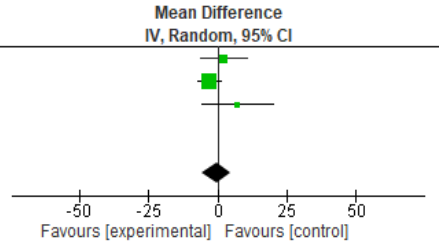




Blood pressure

Study or Subgroup	Experimental Mean	SD	Total	Control Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
Balliot et al 2013, 2018	-9.9	12.1	13	-11.9	9.4	12	27.4%	2.00 [-6.46, 10.46]
Coen 2015, 2015; Woodlief 2015; Nunez Lopez 2015	-7.3	11.9	66	-4.2	12.8	62	59.0%	-3.10 [-7.39, 1.19]
Huck et al 2018	6.9	16.6	7	-0.25	6.5	8	13.6%	7.15 [-5.95, 20.25]
Onofre et al 2017	-40	10	6	11.7	15	6	0.0%	-51.70 [-66.12, -37.28]
Total (95% CI)			**86**			**82**	**100.0%**	**-0.31 [-5.52, 4.90]**

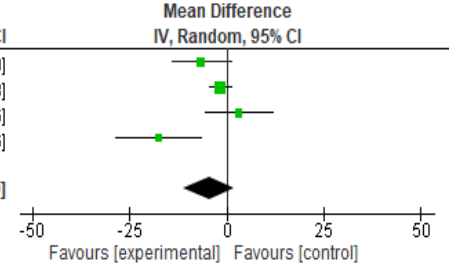
Heterogeneity: Tau² = 7.17; Chi² = 2.86, df = 2 (P = 0.24); I² = 30%
Test for overall effect: Z = 0.12 (P = 0.91)



MDT interventions had **no effect** on post-op systolic blood pressure
(MD: -0.31 [95%CI: -5.52, 4.90] p=0.91; low heterogeneity; GRADE: Very low)

Study or Subgroup	Experimental Mean	SD	Total	Control Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
Balliot et al 2013, 2018	-5.3	9.7	13	1.2	9.9	12	24.6%	-6.50 [-14.19, 1.19]
Coen 2015, 2015; Woodlief 2015; Nunez Lopez 2015	-4.3	8.4	66	-2.7	8.5	62	34.9%	-1.60 [-4.53, 1.33]
Huck et al 2018	1.4	11.3	7	-1.75	2.9	8	22.6%	3.15 [-5.46, 11.76]
Onofre et al 2017	-21.6	10	6	-4.1	9.5	6	18.0%	-17.50 [-28.54, -6.46]
Total (95% CI)			**92**			**88**	**100.0%**	**-4.59 [-11.06, 1.89]**

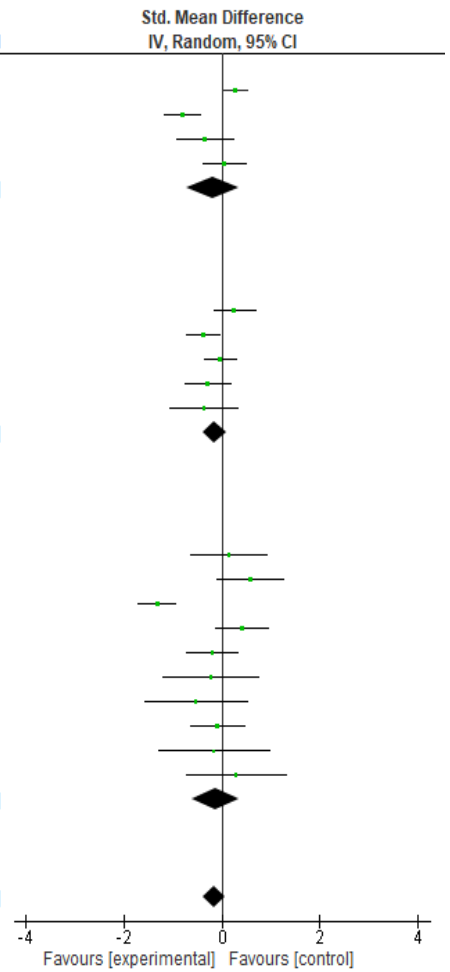
Heterogeneity: Tau² = 29.01; Chi² = 10.15, df = 3 (P = 0.02); I² = 70%
Test for overall effect: Z = 1.39 (P = 0.16)



MDT interventions **no effect** diastolic blood pressure
(SMD: -4.59 [95%CI: -11.06, 1.89]; p=0.16; high heterogeneity; GRADE: Very low)

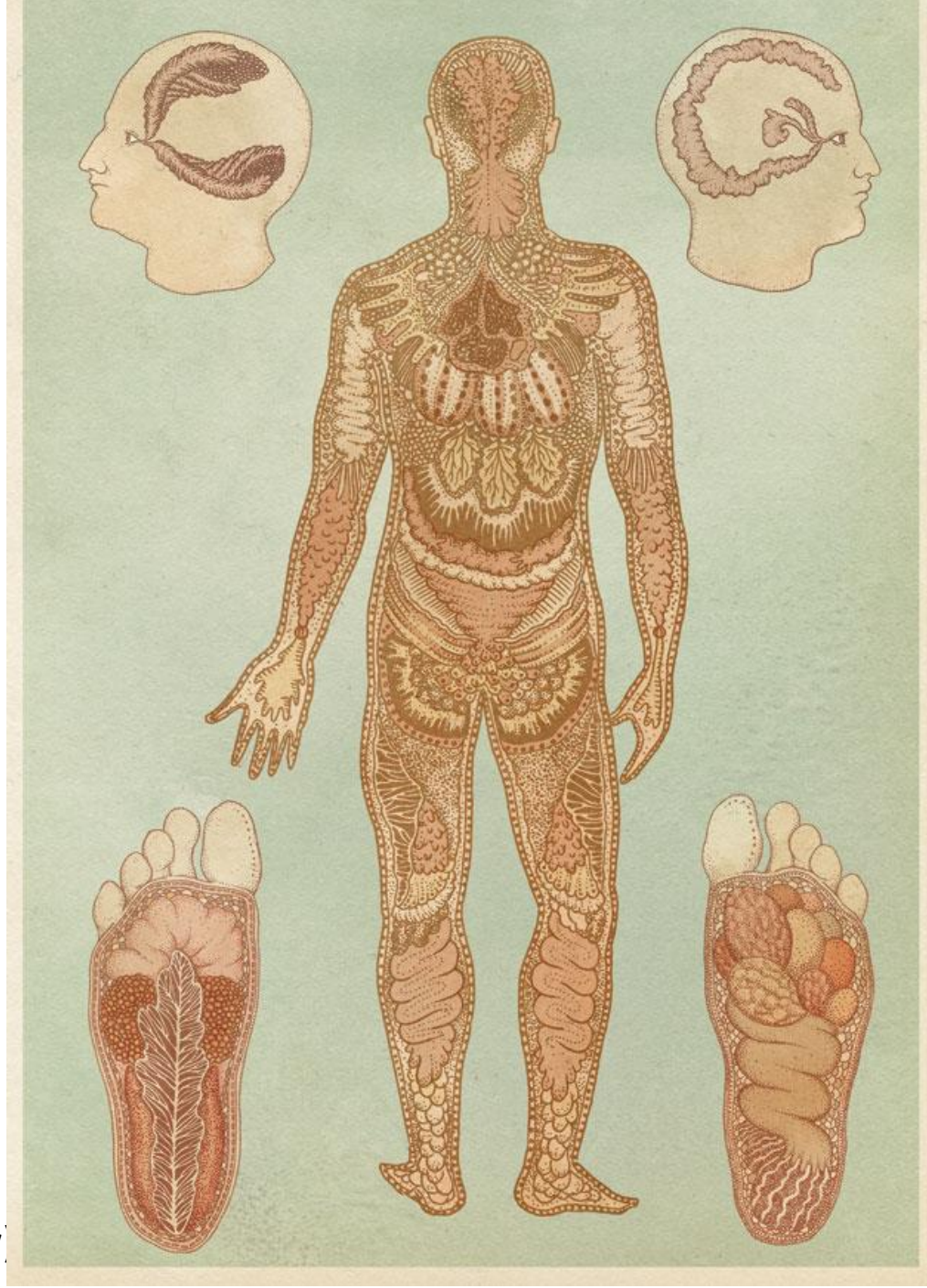
Weight loss by MDT type

Study or Subgroup	Experimental Mean	SD	Total	Control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
1.3.1 Lifestyle and nutrition focused interventions								
Kalarchian et al 2013 and 2016	-22.8	15	114	-27.4	18	114	7.1%	0.28 [0.02, 0.54]
Nijamkin et al 2012 and 2013	-25	15.5	57	-13.1	14.2	66	6.5%	-0.80 [-1.17, -0.43]
Parikh et al 2012	-5.27	2.7	26	-4.4	2.1	21	5.3%	-0.35 [-0.93, 0.23]
Sarwer et al 2012	-32.3	2	40	-32.4	2	41	6.1%	0.05 [-0.39, 0.49]
Subtotal (95% CI)			**237**			**242**	**25.1%**	**-0.19 [-0.73, 0.34]**
Heterogeneity: Tau² = 0.26; Chi² = 22.93, df = 3 (P < 0.0001); I² = 87%								
Test for overall effect: Z = 0.71 (P = 0.48)								
1.3.2 Psychology focused interventions								
Gade et al 2014 and 2015	-37.3	10.073	43	-40	10.455	41	6.2%	0.26 [-0.17, 0.69]
Galle et al 2017	-27	15.5	68	-21.3	14.2	76	6.7%	-0.38 [-0.71, -0.05]
Hollywood et al 2012 and 2015; Ogden et al 2015	-16.6	5.4	73	-16.37	5.6	72	6.8%	-0.04 [-0.37, 0.28]
Lier et al 2012	-46.1	9.9	39	-42.9	12.7	30	5.9%	-0.28 [-0.76, 0.20]
Tucker et al 1990	-55.04	15.85	17	-48.77	17.88	15	4.6%	-0.36 [-1.06, 0.34]
Subtotal (95% CI)			**240**			**234**	**30.2%**	**-0.14 [-0.39, 0.10]**
Heterogeneity: Tau² = 0.03; Chi² = 6.49, df = 4 (P = 0.17); I² = 38%								
Test for overall effect: Z = 1.18 (P = 0.24)								
1.3.3 Physical activity focused interventions								
Balliot et al 2013, 2018	-6.1	7.4	14	-7.3	8.4	12	4.3%	0.15 [-0.62, 0.92]
Bond et al 2015, 2015, 2016, 2017, 2017	-24.5	8.5	22	-30.1	10.7	14	4.7%	0.58 [-0.10, 1.27]
Coen 2015, 2015; Woodlief 2015; Nunez Lopez 2015	-14.6	1.1	66	-13.2	1	62	6.4%	-1.32 [-1.71, -0.94]
Creel et al 2016	-38.4	2.8	24	-39.5	2.5	33	5.6%	0.41 [-0.12, 0.94]
Creel et al 2016 - IG2	-40	2.7	25	-39.5	2.5	33	5.7%	-0.19 [-0.71, 0.33]
Daniels et al 2018	-16.5	8.5	8	-14.2	10.7	8	3.4%	-0.23 [-1.21, 0.76]
Huck et al 2018	-8.8	6.2	7	-5.6	5.3	8	3.2%	-0.53 [-1.56, 0.51]
Mundbjerg 2018, 2018; Stolberg 2018, 2018	-8.1	18	27	-6.5	18.2	25	5.5%	-0.09 [-0.63, 0.46]
Onofre et al 2017	-31	11.7	6	-27.6	23.8	6	2.8%	-0.17 [-1.30, 0.97]
Stegen et al 2011	-17.9	5.8	8	-20.1	8.1	7	3.2%	0.30 [-0.72, 1.32]
Subtotal (95% CI)			**207**			**208**	**44.7%**	**-0.12 [-0.60, 0.35]**
Heterogeneity: Tau² = 0.43; Chi² = 44.14, df = 9 (P < 0.00001); I² = 80%								
Test for overall effect: Z = 0.51 (P = 0.61)								
Total (95% CI)			**684**			**684**	**100.0%**	**-0.16 [-0.40, 0.08]**
Heterogeneity: Tau² = 0.19; Chi² = 76.19, df = 18 (P < 0.00001); I² = 76%								
Test for overall effect: Z = 1.29 (P = 0.20)								
Test for subgroup differences: Chi² = 0.04, df = 2 (P = 0.98), I² = 0%								



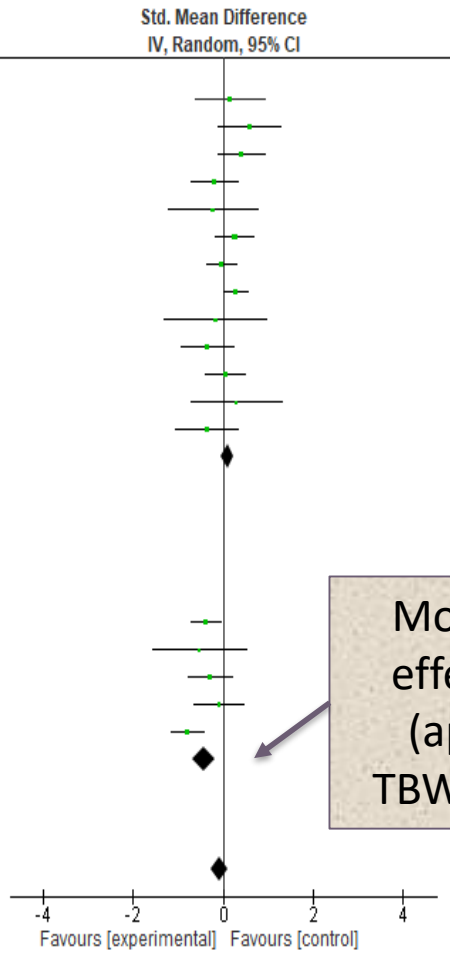
There is **no effect** of any MDT-type on weight loss

(SMD: -0.16 [95%CI: -0.40, 0.08]; p=0.20; high heterogeneity; GRADE: very low)



Weight loss by time of delivery

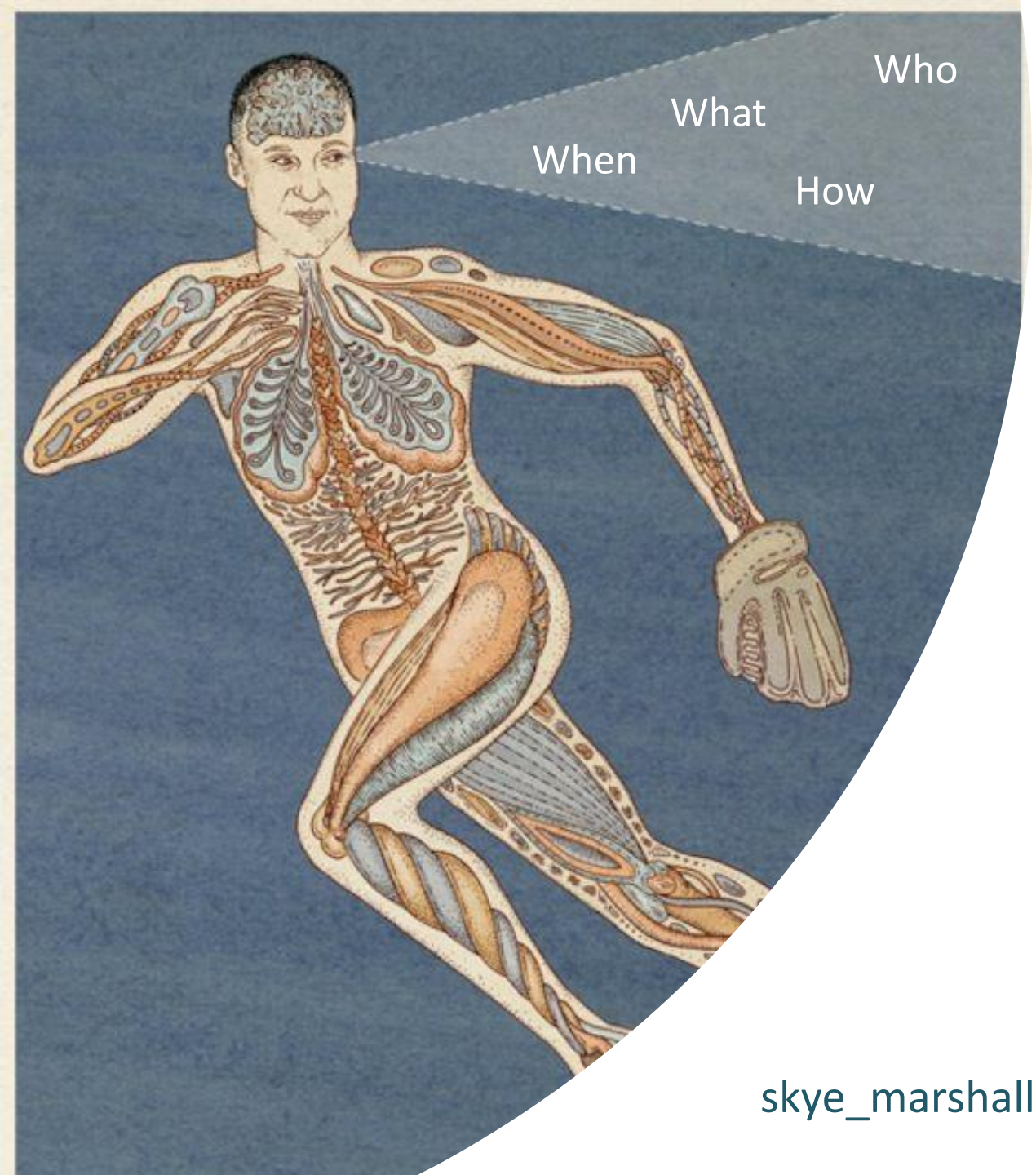
Study or Subgroup	Experimental Mean	SD	Total	Control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
2.1.1 Interventions concluded prior to 6-months post-op								
Balliot et al 2013, 2018	-6.1	7.4	14	-7.3	8.4	12	3.8%	0.15 [-0.62, 0.92]
Bond et al 2015, 2015, 2016, 2017, 2017	-24.5	8.5	22	-30.1	10.7	14	4.5%	0.58 [-0.10, 1.27]
Creel et al 2016	-38.4	2.8	24	-39.5	2.5	33	5.9%	0.41 [-0.12, 0.94]
Creel et al 2016 - IG2	-40	2.7	25	-39.5	2.5	33	6.0%	-0.19 [-0.71, 0.33]
Daniels et al 2018	-16.5	8.5	8	-14.2	10.7	8	2.7%	-0.23 [-1.21, 0.76]
Gade et al 2014 and 2015	-37.3	10.073	43	-40	10.455	41	7.1%	0.26 [-0.17, 0.69]
Hollywood et al 2012 and 2015; Ogden et al 2015	-16.6	5.4	73	-16.37	5.6	72	8.4%	-0.04 [-0.37, 0.28]
Kalarchian et al 2013 and 2016	-22.8	15	114	-27.4	18	114	9.3%	0.28 [0.02, 0.54]
Onofre et al 2017	-31	11.7	6	-27.6	23.8	6	2.2%	-0.17 [-1.30, 0.97]
Parikh et al 2012	-5.27	2.7	26	-4.4	2.1	21	5.4%	-0.35 [-0.93, 0.23]
Sarwer et al 2012	-32.3	2	40	-32.4	2	41	7.0%	0.05 [-0.39, 0.49]
Stegen et al 2011	-17.9	5.8	8	-20.1	8.1	7	2.6%	0.30 [-0.72, 1.32]
Tucker et al 1990	-55.04	15.85	17	-48.77	17.88	15	4.3%	-0.36 [-1.06, 0.34]
Subtotal (95% CI)			**420**			**417**	**69.1%**	**0.10 [-0.03, 0.24]**
Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 12.27$, df = 12 (P = 0.42); $I^2 = 2\%$								
Test for overall effect: Z = 1.47 (P = 0.14)								
2.1.2 Interventions which continue past or commence at 6-months post-op								
Coen 2015, 2015; Woodlief 2015; Nunez Lopez 2015	-14.6	1.1	66	-13.2	1	62	0.0%	-1.32 [-1.71, -0.94]
Galle et al 2017	-27	15.5	68	-21.3	14.2	76	8.4%	-0.38 [-0.71, -0.05]
Huck et al 2018	-8.8	6.2	7	-5.6	5.3	8	2.5%	-0.53 [-1.56, 0.51]
Lier et al 2012	-46.1	9.9	39	-42.9	12.7	30	6.5%	-0.28 [-0.76, 0.20]
Mundbjerg 2018, 2018; Stolberg 2018, 2018	-8.1	18	27	-6.5	18.2	25	5.7%	-0.09 [-0.63, 0.46]
Nijamkin et al 2012 and 2013	-25	15.5	57	-13.1	14.2	66	7.8%	-0.80 [-1.17, -0.43]
Subtotal (95% CI)			**198**			**205**	**30.9%**	**-0.44 [-0.69, -0.18]**
Heterogeneity: $Tau^2 = 0.03$; $Chi^2 = 5.79$, df = 4 (P = 0.22); $I^2 = 31\%$								
Test for overall effect: Z = 3.38 (P = 0.0007)								
Total (95% CI)			**618**			**622**	**100.0%**	**-0.08 [-0.26, 0.11]**
Heterogeneity: $Tau^2 = 0.08$; $Chi^2 = 38.65$, df = 17 (P = 0.002); $I^2 = 56\%$								
Test for overall effect: Z = 0.84 (P = 0.40)								
Test for subgroup differences: $Chi^2 = 13.50$, df = 1 (P = 0.0002), $I^2 = 92.6\%$								



Moderate effect size (approx. TBWL% 6.8)

MDT interventions which continued past or commenced at 6-months post-op **increased weight loss**

(SMD: -0.44 [95%CI: -0.18, -0.69]; p=0.0007; moderate heterogeneity; GRADE: low)



Findings

When

Basic MDT support pre- and post-op
+ intensive MDT ≥3-months commencing 6-months post-op

What

Lifestyle or diet counseling, supervised exercise, and/or cognitive behavioral therapy

Who

Any allied health + usual MDT

How

In-person or telehealth

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